ABSTRACT

Study of retention properties of polymeric stationary phases

Diploma thesis

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The thesis was focused on the comparison of retention properties of polymer stationary phases based on acrylate and styrene with reversed phases based on zirconium dioxide and commonly used silica gel C18. Cyclosporine A (CsA) and his accompanying impurities B (CsB), C (CsC) and D (CsD) were used model analytes. Measurements were carried out in the analytical scale to obtain basic data for the employment of polymeric phases as the appropriate sorbents in preparative chromatography with regard to their high volume commercial availability.

The effect of organic solvent was tested on the separation and separation efficiency. The main attention was focus on the methanolic mobile phases (MF) in the case of polymeric phases due to the economic reasons. All impurities were separated on column silica gel C18 (MF = methanol 80 %) and polymethacrylate C18 (MF = methanol 71 %). Impurity CsB was not separated on column ethylstyrene-divinile copolymers (DVB) (MF = methanol 90 %) and moreover the co-elution of CsD with CsA occured. Peak tailing was observed in a methanolic mobile phase on the zirconia-based polystyrene column. The coelution of CsB, CsD with CsA occured (MF = methanol 50 %).

The mass overload is used to detect separation capacity of a column which is important for preparative chromatography. It was estimated by the measurement of the retention factor shift by 10 %. The results showed that amount of injected CsA were 0,42 mg (polymethacrylate C18), 0,45 mg (DVB), 0,90 mg (silica gel C18), respectively.

Keywords: HPLC, polymeric stationary phases, overload, cyclosporine